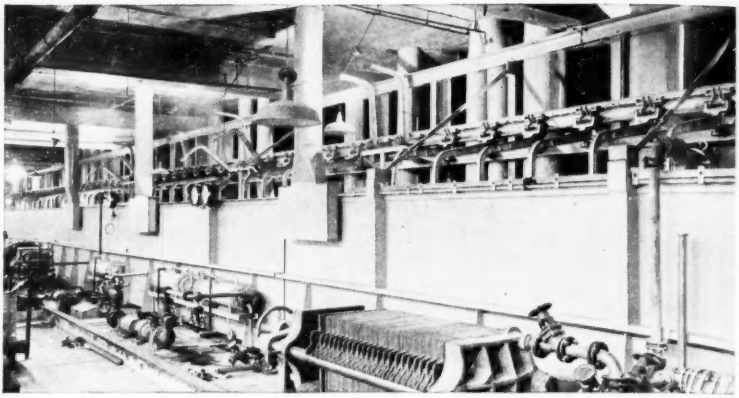
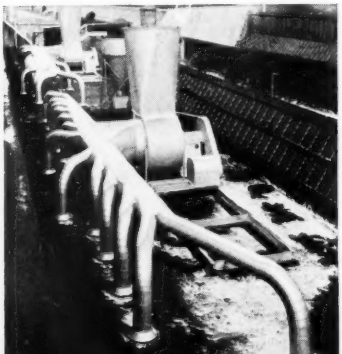
HAZARDS & SAFETY



KIRK & BLUM EXHAUST SYSTEMS

Illustration above shows Kirk & Blum installation on Stevens automatic cleaning and pickling machines in the plant of a leading manufacturer of electric refrigerators. Suction piping connections and header, exhaust fans and discharge stacks on factory roof are shown below.



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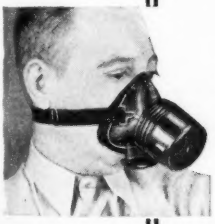
The WILLSON Industrial Hygiene Laboratories continue to work hand in hand with industry in the development of safe and efficient respiratory protective devices. Our latest laboratory developments include two styles approved for Type A Dusts and now approved for LEAD Dusts.

Nos. 200 and 750 approved for Type A Dusts

Nos. 200L and 750L approved for Lead Dusts

2 Styles
NOW APPROVED FOR LEAD AND TYPE "A" DUSTS



No. 200 for Type A Dusts
No. 200L for Lead Dusts

Employs a felt filter which is easily cleaned by introducing a jet of compressed air into the core. Bears U. S. Bureau of Mines Approvals Nos. 2118 and 2123.

TYPE A DUSTS are defined as "pneumoconiosis-producing or nuisance dusts, as quartz, asbestos, iron ores, cement, limestone, gypsum, coal, coke, charcoal, wood, cellulose, flour and aluminum."

LEAD DUSTS are defined as "mechanically generated dusts whose main harmful constituent is lead" as encountered in manufacturing batteries; enameling; pottery making; rubber compounding; sandpapering and chipping painted surfaces; mining, milling and processing lead ores.

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This is the only respirator requiring but one inexpensive throw-away filter on each side. Bears U. S. Bureau of Mines Approvals Nos. 2119 and 2125.

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Pulmosan can meet all your safety needs; Goggles, Masks, Safety Clothing, Gloves, Chemical Handling, Tools, First Aid, etc. If it's for safety, we have it.

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SAFETY EQUIPMENT CORP.

Dept. OH

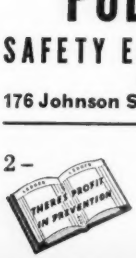
176 Johnson St., Brooklyn, N.Y.

DECEMBER is inventory month. It has long been the custom of business and industry to take advantage of this year-end month, when stocks are at their lowest point, to make an accounting of their physical assets—stocks on hand, raw materials and equipment. "Pre-inventory" and "year-end" sales are designed to move merchandise and clear the way for a quick and simple inventory.

Why not a "Prevention Inventory"? The inventory period is a natural time for industry to check up on its health and safety record for the past year, and to survey plant conditions and equipment for health and safety hazards. Industrial health and safety are important integral parts of the operation of every industrial organization, large or small. As such, health and safety hazards are real liabilities, potential "loss" items in the financial statements of industry. Therefore, if an inventory is to be thorough, it must include engineering, technical and medical surveys of occupational hazards.

Taking the country as a whole, occupational injuries and deaths for the year 1938 will be lower than for previous years. Figures for the first eight months of 1938 indicate a decrease of approximately 14%, as compared with the corresponding period for 1937. This is an encouraging record. However, industry cannot rest upon any laurels achieved in the past. This question must be faced. Will the record for the coming year show a still greater improvement in occupational health and safety?

The answer to that question rests with



industrial management, labor, safety engineers, industrial hygienists and others concerned with industrial safety in all its broad aspects. Factors working to make this task more difficult are the constant development of new products and processes, and new materials and methods in manufacturing. The speed of the technical progress of modern industry creates new hazards almost daily. The problem is not one of preventing or retarding this progress. Rather, it is one of instituting and maintaining healthful conditions and safe practices to keep pace with this industrial progress, thereby encouraging industrial achievement and enhancing the resultant benefits to all. Occupational Hazards and Safety pledges its wholehearted support and co-operation to industry in taking the leadership to achieve this objective.

Industrial executives today are agreed that occupational diseases and injuries represent an important cause of waste and inefficiency in industry. Executives who appreciate the relationship between healthful and safe conditions and profitable operations will find that a "Prevention Inventory" will prove invaluable towards achieving a better all-round production record in the coming year.

A "Prevention Inventory" should include a complete check-up on all machinery, making certain that guards are placed where they are needed, and that existing guards are adequate and in good repair; a survey of dust and fume removing and collecting systems, determining the condition and effectiveness of hoods, pipes, fans and similar equipment; all electrical equipment should be gone over thoroughly to see that wires are covered, connections are tight, and that motors and switchboxes are in perfect condition; cranes should be inspected to make certain that cables, pulleys, motors, tracks, etc., are functioning properly; all hand tools should be tested for any defects which may cause serious injuries; protective equipment used by the workers should be thoroughly inspected to make certain that adequate protection is afforded the user, and any worn equipment replaced with new devices; tests should be conducted at all operation points where there may exist a dust, fume or gas hazard; medical examinations should be given to workers who have been employed on operations which present a potential toxicant hazard.

It will pay you to make a "Prevention Inventory" along with your usual year-end inventory. Eliminating occupational hazards will mean that your plant will operate safer, more efficiently and more profitably in the coming year. Replace any hazards with safe equipment, tools, methods, and practices. *For there is profit in prevention.* That is no mere catch phrase—it is a fact proven by the country's most astute industrialists, both large and small.

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Eyeshields

For gas welding and cutting, blow torch work, and general maintenance work, our Type B Eyeshield protects workmen's eyes, is comfortable, non-fogging. Takes standard 2 x 4 1/8 in. lens.

Write for circular describing six types of Jackson Eyeshields.

JACKSON ELECTRODE HOLDER CO.
15120 Mack Avenue Detroit, Michigan

USEFUL FREE LITERATURE

Readers may obtain copies of any of the publications described herein by use of the coupon on page 6.

049—ELECTRIC HOISTS

An attractively bound, 32-page catalog, "Cable King" has been issued by Yale & Towne Manufacturing Co., illustrating and describing air-cooled, wire rope electric hoists, and related accessories. Dimensional diagrams and data are given for each type.

050—SPRAY WHEELS

A new two-page folder, describing and illustrating Spray Wheels, Air Washers, and Bassler Gas Scrubbers, has been issued by the D. J. Murray Manufacturing Co.

051—LADDER SHOES

The Rose Manufacturing Co. announces the publication of a new four-page folder on ladder shoes. The folder illustrates the hazards involved in the use of ladders without shoes and the holding power of ladder shoes on various types of surfaces.

052—REMOTE CONTROL SYSTEMS

An 8-page folder of the Tompkins-Johnson Co., Jackson, Michigan, describes and illustrates remote control systems for the safe operation of presses. The folder lists the safety features and describes the operation of the different type control systems as well as the control units.

053—SAFETY AWARDS

A 24-page, profusely illustrated catalog is available from the Williams Jewelry and Manufacturing Co. A broad line of trophies, plaques, shields, pins, medals, and other awards are described with prices.

054—SURFACE TREATMENT

"How to Prevent Rutted Floors" is the title of a six-page folder of the Stonhard Company, Philadelphia. This folder describes and illustrates the application of "Stonhard" to preserve concrete floors.

055—FUME COLLECTORS

Fume and dust collectors, and sand blast equipment are described and illustrated in a new folder of the Ruemelin Manufacturing Co. Illustrations show actual use of equipment.

056—CLEANERS

Various types of portable and tank cleaners are described and illustrated in a new 4-page folder of the Ideal Commutator Dresser Co. Special attachments for blowing, vacuum and spraying operations are shown.

057—MACHINE GUARDS

Two-page folder showing installations of Falstrom approved machine guards. Issued by Falstrom Company, Passaic.

058—FRICTION CLUTCHES

The Carlyle Johnson Machine Co. announces the publication of a new 1939, 10-page catalog illustrating and describing their Friction Clutches. The catalog is 6″ x 9″ in size and lists both the standard clutch and super-type, as well as the latest improvements and changes in prices.

[*Continued on page 6*]

OCCUPATIONAL
Hazards and Safety

Vol. 1, No. 3

Cover—Workers, entering tank where carbon monoxide fumes are present, protected by air line type gas masks. Photo courtesy Mine Safety Appliances Co.

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R. C. Walker, Editor
E. J. McFadden, Asst. Ed.
G. B. Park, Production Mgr.

Alfred G. Rauf, Representative
Harold Steffens, Representative

059—SAFETY SOLVENTS

"Scientific Metal Cleaning" is the title of a new, attractively styled, 12-page catalog of the Detroit Rex Products Company. This catalog describes solvent degreasing and alkali cleaning with the Detrex equipment.

060—SAVE-LITE CATALOG

Sherwin-Williams, in co-operation with the Better Vision Institute and the National Better Light—Better Sight Bureau, has prepared a 32-page, blue-bound catalog. The "Save-Lite" Catalog is a factual presentation of painting as a part of lighting and plant conditioning. Laboratory studies, industrial applications, case histories and charts on lighting standards are included.

061—BENZOL INDICATOR

Bulletin of Mine Safety Appliances Co., illustrating and describing the new M.S.A. Benzol indicator.

062—AIR EXHAUST

Dimension and specification data are included in the 4-page folder issued by the Falstrom Company describing the Falstrom "Penthouse" for the control of dusts and fumes. Typical installations are shown.

063—THERMO-GRIP TOOLS

A 6-page folder of the Ideal Commutator Dresser Co., describes various types of soldering units and tools with the "Thermo-Grip." Typical uses and specifications are included in the descriptive data.

064—COMBATING DERMATITIS

A folder by the G. H. Packwood Mfg. Co. presenting data on the dermatitis preventive effects of the company's specially compounded industrial hand soap. Featured as one that can also be safely used on the face, in the shower and for shampooing, its action against dermatitis is said to be a prophylaxis type in that it removes common and specific irritants without injurious effect on the skin or natural oil glands.

065—PLANT CLEANING

The part played by modern cleaning methods and equipment in promotion of plant safety, efficient production and personnel relations is outlined in a new 12-page booklet just published by Oakite Products, Inc. Considerable space is devoted in it to factors in eliminating conditions pre-disposing to industrial fires, and to workmen health maintenance through plant sanitation.

066—HEAD AND EYE PROTECTION

A new catalog giving full details about the head and eye protection devices manufactured by the Chicago Eye Shield Company has just come from the press. Practical, useful facts and illustrated data cover goggles, spectacles, respirators, masks, shields and other important industrial safety equipment of this nature.

DUST CONTROL NOTE

Details regarding effective dust control equipment are given in a special catalog of the Kirk & Blum Manufacturing Company, one of whose installations, described in an article, *Relief Work in a Dust Bowl*, in the November issue of this magazine, has elicited inquiries from several engineers.

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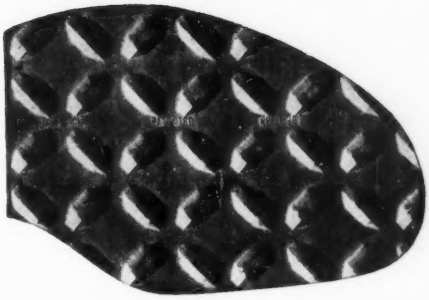

Here's SAFETY underfoot

APPROXIMATELY 80 little cleats hold your workman's shoes every time he takes a step on Multigrip Floor Plate. Multigrip gives positive traction for starting, stopping, pushing, pulling. It reduces slipping and skidding to a minimum. So we say—hunt out the danger spots in your plant—the spots where a fall would mean serious injury—and install U·S·S Multigrip Floor Plate.

No shoe or narrow-tired wheel can catch in the beveled edges of the risers —yet both are held firm against slipping. Dirt can't lodge in the corners. Cleaning is easy and water drains away quickly.

Wherever there's a footing hazard, install Multigrip Floor Plate — in machine shops, engine rooms, boiler rooms, on operating platforms, stairs, ramps, runways, on heavy construction equipment, bridges, and car platforms. Multigrip Floor Plate assures safe footing in all kinds of weather—reduces lost time accidents.

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UNITED STATES STEEL

AMERICA'S Number 1 industry, Steel has made almost as many notable contributions to industrial hygiene as it has to modernized industrial production.

Painting courtesy Republic Steel Corp.—Agency, Meldrum & Fewsmith.

Where There's Smoke There's Fire—and Carbon Monoxide

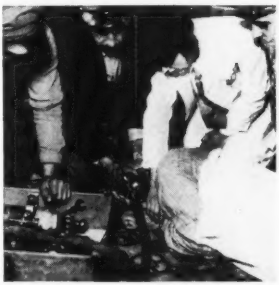
Colorless and odorless, as its chemical symbol CO might indicate, carbon monoxide is an industrial hazard second to few in the scope of toll.

By HOWARD STARK
Data based on studies by
L. B. Berger and H. H. Schrenk

WHEN we talk about carbon monoxide, dire pictures of suicides in closed garages, and unfortunate accidents in homes where a gas heater has been left lighted overnight, come to mind. Among the entire population, carbon monoxide takes its greatest toll in these two ways. And non-occupational fatalities exceed occupational deaths from this cause. Yet, an occupational hazard from carbon monoxide gas most definitely exists in industry—in coal and metal mines, steel mills, metal refineries, automotive and other industries in which there are processes or operations involving the oxidation or combustion of carbon-containing material.

The old adage, "Where there is smoke there is fire," might well be amended to read, "Where there is fire, there is carbon monoxide." The gas probably had its beginning when man first came into possession of fire. It is recognized as the oldest industrial poison. Carbon monoxide is produced by the incomplete combustion of carbon, burning in an atmosphere without sufficient oxygen. The gas may be considered to be a normal product of combustion, as an automobile exhaust gas, or an abnormal product, as, for example, space heaters.

It seems almost paradoxical that a colorless, odorless, tasteless and non-irritating gas should present such a deadly hazard in its effect upon the human system. Unlike the rattler, it strikes without warning. Yet, it is this very fact—the fact that its presence is neither seen nor felt—that makes it such a great hazard. And these same characteristics make methods for detecting its existence and determining the atmospheric content so important. With present-day knowledge concerning the gas, equipment to detect its presence and protective devices to protect workers, poisoning by carbon monoxide gas is a "sin of omission rather than



A CO victim for whom the inhalator arrived too late.

THERE'S PROFIT IN PREVENTION

Testing for presence of CO in dangerous concentration in a city transit bus, from exhaust leakage.

commission." In a majority of cases asphyxiation by CO gas is the result of the failure to use proper precautions and equipment.

Carbon monoxide poisoning is a condition caused by the breathing of the gas, which combines with the red coloring matter of the blood, hemoglobin, and cuts off the supply of oxygen from the tissues. The severity of the poisoning depends upon the amount of CO in the atmosphere, the length of time of exposure, and the degree of exertion of persons working in CO contaminated air. In view of the speed and severity with which this gas strikes, methods of detecting its presence and amount of atmospheric concentration are most important. A brief description of some of the ones most commonly and effectively employed at the present time, follows:

Pyrotannic Acid Method

This method is used for the determination of low concentrations of carbon monoxide, range of 0.01 to 0.20 per cent CO. Determination is made by collecting a sample of air in a bottle of 100 to 250 ml. volume. 0.1 ml. of blood, diluted to 2 ml. with water is introduced into the bottle, which is then rotated several minutes to permit the CO to combine and come to equilibrium with the hemoglobin of the blood. This blood solution is then transferred to a test tube (3 ml. volume), to which 0.04 gram of a mixture of equal parts by weight of pyrogallic and tannic acid is added. Contents are thoroughly mixed by gently inverting the tube. The test tube is allowed to stand for approximately a half-hour in a temperature not less than 65° F. and the contents then compared with the color standards. The number of the standard which matches represents the percentage of saturation of the blood with carbon monoxide. The percentage of volume of CO in the air sample is calculated from the blood saturation. Calculations and corrections are made from a chart to ascertain correctly the percentage by volume of carbon monoxide contained in the air sample.

The Hoolamite Detector

This detector is used to determine the carbon monoxide content in the atmosphere of mines after fires and explosions or in air that may contain approximately 0.10% or more of the gas. A semiquantitative estimation of CO can be made with this method where the concentrations range from 0.01% to 1.0%.

The basis for this test is the reaction of hoolamite, a mixture of iodine pentoxide, and fuming sulphuric acid deposited on granular pumice stone. When hoolamite contacts the carbon monoxide gas, iodine is liberated, and the originally white granules are changed to bluish green

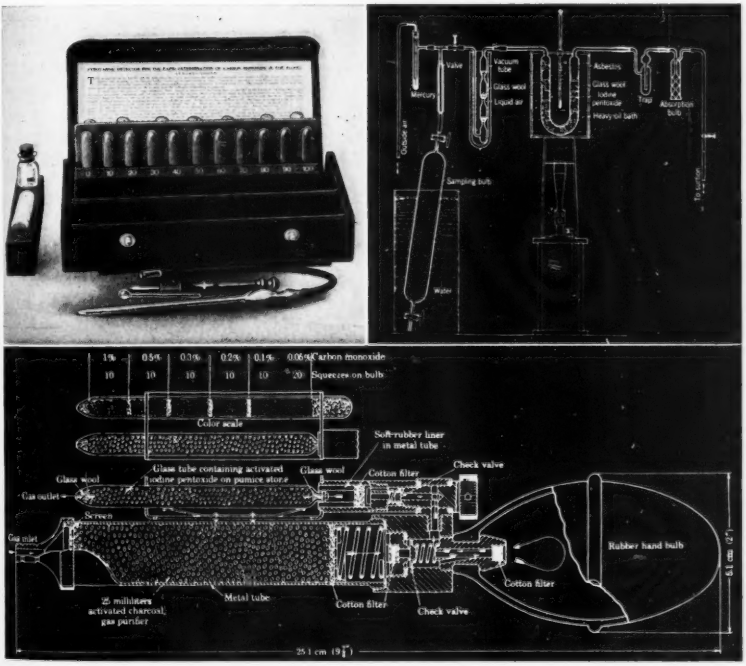
of increasing intensity, then to violate, and finally to black, depending upon the concentration of carbon monoxide in the atmosphere tested.

The detector itself consists of a metal barrel filled with activated charcoal through which the gas sample is drawn by a rubber aspirator bulb. The sample is discharged from the bulb through one of the glass tubes containing hoolamite. A color-comparison tube, which has five permanent color standards on pumice, ranging from 0.10 to 1.0 per cent carbon monoxide, is used for comparison with the hoolamite tube to carefully determine the concentration by volume of carbon dioxide in the atmosphere sampled.

Iodine Pentoxide Method

This is an extremely accurate method of determining the CO content of air contaminated with mine atmospheres, automobile exhaust gas and various other gaseous mixtures. This method is based on the reaction of carbon monoxide with iodine pen-

A pyrotannic acid type of carbon dioxide detector. Upper diagram—Details of iodine tentoxide apparatus for CO detection. Lower diagram—Features of hoolamite or activated iodine tentoxide CO detector unit.



toxide, which results in the liberation of iodine and the formation of carbon dioxide. The quantity of iodine liberated is determined by titration, and as the volume of the sample passed through the apparatus is also known, the percentage by volume of carbon monoxide in the sample may be calculated. The percentage by volume of CO by this method may be determined with a precision of 0.003 in samples containing less than 1.0 per cent of the gas. Concentrations of 0.0005 may be detected.

The iodine pentoxide method operates by passing a measured volume of carbon monoxide through reagents suitable for removing gases other than CO that would react with the iodine pentoxide and produce erroneous results. The freed sample is then passed through a tube containing iodine pentoxide heated to approximately 150° C., then through an absorption bulb containing 10 per cent potassium iodide solution, which retains the iodine liberated by the reaction of the carbon monoxide with the iodine pentoxide. The contents of the bulb are then titrated with standardized sodium thiosulphate solution, starch being used as the indicator.

Gas-Volumetric Methods

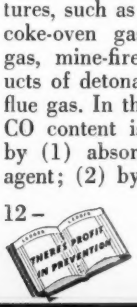
Carbon monoxide content may be determined by gas-volumetric methods in many types of gaseous mixtures, such as manufactured fuel gas, coke-oven gas, automobile exhaust gas, mine-fire gases, gaseous products of detonation of explosives, and flue gas. In this type of analysis, the CO content is generally determined by (1) absorption in a suitable reagent; (2) by oxidation by an easily reducible oxide; and (3) by combustion in air or oxygen.

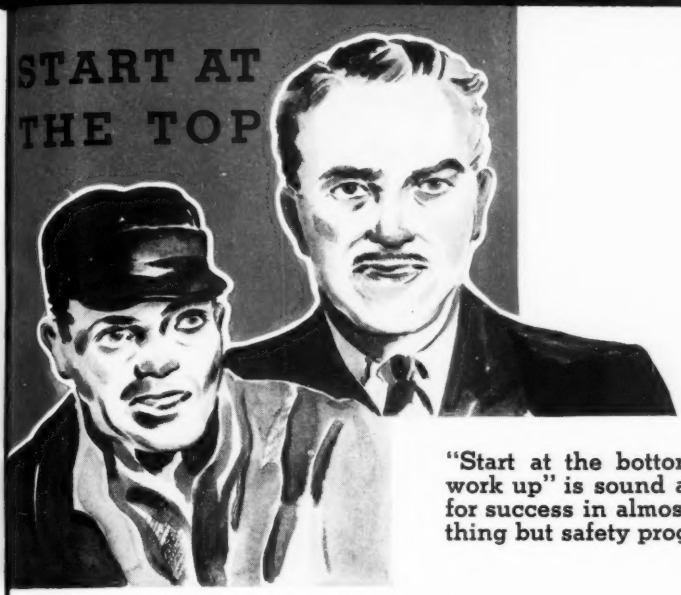
The reagents most frequently used for the absorption of CO gases are: (1) a solution of cuprous chloride in hydrochloric acid, the efficiency of absorption of this reagent being affected by temperature and by the quantity of the gas absorbed. (2) an ammonical solution of cuprous chloride; and (3) a mixture of cuprous sulphate, beta napthol, and sulphuric acid. This third reagent is considered more stable and will absorb CO quantitatively until saturated, but the rate of absorption decreases with the amount of CO absorbed. The percentage of carbon monoxide may be determined with an accuracy of 0.2 to 0.4 per cent with good gas apparatus.

With the oxidation method, carbon monoxide may be determined by passing the gas over a metallic oxide at a temperature that will cause the carbon monoxide to be oxidizd quantitatively to carbon dioxide. Cupric acid, heated to 300° C. is generally used for this purpose. The volume of carbon monoxide formed is determined by absorption in an alkaline solution, such as sodium or potassium hydroxide. The percentage of carbon monoxide in samples that contain none or only a small proportion of these hydrocarbons may be determined to 0.2 to 0.3 by passing them over cupric oxide at 300° C.

The carbon monoxide content of a gas sample may be determined by burning it in air or oxygen in contact with a heated surface. A platinum wire heated bright yellow by an electrical current is generally used, and the procedure referred to as the slow combustion method. The carbon

[*Continued on page 38*]





"Start at the bottom and work up" is sound advice for success in almost anything but safety programs.

By ERNEST W. BECK
Supervisor of Safety, United States Rubber Products, Inc.

A SURVEY of our industries would unquestionably demonstrate that our most efficient factories are those in which the greatest attention is paid to the health and safety of employees. Show me an organization that is doing everything possible to establish and maintain safe methods and practices and I can probably show you an organization efficiently and economically managed in every other respect.

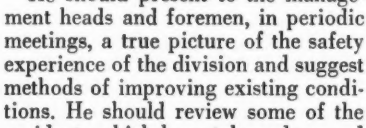
In order to be of greatest value, safety, in all divisions of activity, should be organized. And safety, in order to be properly organized, should most certainly start at the top. The importance and necessity of the "big boss" taking an active interest in the safety program cannot be overemphasized. Employees down the line cannot be asked or expected to take any more interest in the subject of safety than does the "big boss." The success or failure of a safety program is guided by and dependent upon the respect and enthusiasm top management shows for safety practices and safety promotion.

Once the "big boss" is sold on a safety program then the responsibility for its success rests, particularly in large units, with a Safety Supervisor, Safety Engineer, or whatever other title he may be given.

I believe that every firm of any size should have one man in charge of safety work in that organization. If the size of the company or the question of costs does not justify assigning a full-time man on this job,

by all means hire a man for the job or assign half an employee's time to it, making his primary duty that of looking after the safety and health of workers. This supervisor should have sufficient general experience to enable him to see his problems clearly and to work out their solutions satisfactorily. His value to the work will be greatly enhanced by technical training, by specific experience in the units or divisions in which he promotes safety, and by personal experience with the men with whom he works. One of the most important qualifications is enthusiasm. No man will succeed in this work in the long run without a compelling, contagious enthusiasm.

He should present to the management heads and foremen, in periodic meetings, a true picture of the safety experience of the division and suggest methods of improving existing conditions. He should review some of the accidents which have taken place and not only enlighten these men but get their co-operation. Without their support the safety job cannot be done.



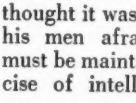
Not many years ago safety work was considered a part of discipline, and discipline was achieved by holding a club, so to speak, over the worker's head. In those days the supervisor thought it was good discipline to keep his men afraid of him. Discipline must be maintained today by the exercise of intelligent leadership. This means that supervisors and foremen must win the co-operation of their workers. Give each worker the reason why, be considerate and fair and above all be human. Also, since *he* is human, tangible incentives are exceedingly valuable in safety work. Contests, prizes, bonuses—they work wonders for what they cost.

Safety Committees

The organization of Safety Committees, inculcation of competition between departments, educational work such as bulletins, slogan contests, inspections, moving pictures, etc., will go a long way towards helping the supervisor do a real accident prevention job.

One of the first and most important jobs of a Safety Department is to organize active Safety Committees. In our factories we have several Safety Committees; each department would have its own Departmental Safety Committee meeting, say twice a month. These Committees can usually take care of their own recommendations. If, however, they cannot, then the recommendations are passed on to an Advisory Committee composed of staff men.

All recommendations made by Safety Committees or inspectors appointed by Safety Committees should be given attention and not allowed to die. All recommendations should be brought up at following meetings to ascertain if the recommendation was carried out; if not, a reason given. Don't think by organizing a Safety Committee your safety problems are solved. Your Committee must not be allowed to lose interest or it will die a natural death. It is the job of the Safety Engineer to pro-



vide the Committee with interesting literature, talk to them about their jobs and get them talking to others about safety.

Accident Statistics

In order to determine the value of organized safety in industry every safety department or plant should keep accurate records of their number of accidents, causes, time lost and their cost. It is impossible to know where you are or which way you are going unless these figures are reliable and are kept up to date. It is not sufficient to only keep such records but in order to cash in on their value they should be used properly. The statistical work of the safety department is similar to the work of an accounting department in any well organized company. It is the accounting department which figures out the profits or loss—the same is true with accident figures. They should also show the success of your accident prevention work. The real safety man should not be satisfied with just his own company data but should have the accident statistics of some other concern so that he may compare his own experience with the industry as a whole or with the experience of other concerns. Give accident statistics wide publicity in your organization in such a way that they will cause the negligent to do better.

The proof of good safety work can be shown by proper statistics. Always have your statistics ready to show. The big boss is interested in the end figure. He is used to dealing with figures and can readily visualize the trend. By all means have accurate statistics, keep them brief and when you get them use them.

Instruction and Training

The supervisor or foreman should assume the responsibility of seeing that new workers are properly broken in. A foreman or supervisor is usually sized up very quickly by the new employee during his first few hours in the department. It is in this time that the worker is in a receptive mood and if the foreman is wise he will see to it that the right impression is given to the new man. This is one of the best times to register accident prevention upon the new employee.

You never heard of workers hating their boss because he looked out for their safety. We all know how an employee must feel towards his superior if he neglects his safety. To have a safety-minded boss means a great deal to the worker and also to the worker's family. One of the best places to cultivate industrial good will is in the field of accident prevention. The foreman, with a good active, sincere accident-prevention program in his department, is certain to cultivate good will and this good will will not only eliminate accidents but will bring about economic results in quantity and quality of production.

I have often had the unpleasant task of investigating very serious accidents, and I am sorry to say that some of them would never have happened if safe working conditions and proper equipment had been provided and used. Accident prevention, to accomplish the desired results, must have the whole-hearted support of the entire organization and the management must be willing to back up its good intentions financially, without quibbling over minor expenditures.

(Digest of recent address before the Federal Interdepartmental Safety Council)

The first few minutes

Correct and immediate First Aid saves both workers' lives and employers' dollars.

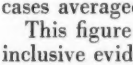
By HARRISON WADE

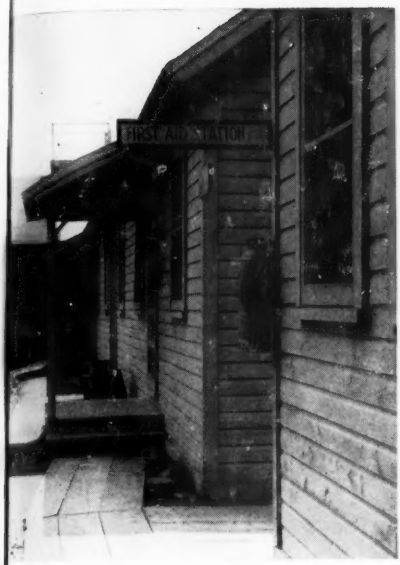
IS IT worth while, in terms of dollars and cents alone, to reduce the severity of occupational injuries 50 per cent? Obviously, the answer of executives, safety engineers, supervisors and other safety officials, to this question is "yes." Just as obviously, these same officials will ask: "How can it be done?" The answer to that question is found in adequate first aid equipment and intelligent use of this equipment.

A survey of a large group of injuries resulting from handling sharp or rough objects (all of which were equally severe at the beginning) showed that in cases where the wound became infected, compensation paid averaged $188.00, while non-infected cases averaged $93.00.

This figure is not presented as all-inclusive evidence that first aid treatment is the cure-all for reducing the severity and cost of occupational injuries. However, experience proves that prompt treatment of certain types of injuries will result in decreasing the effect of an injury and also the cost of treatment and compensation.

"First aid" is just exactly what those two words imply—the first treatment of any injury. It is, except in cases of so-called minor injuries, an emergency measure adopted to supply assistance to the injured between the time the accident occurred and the time when complete medical attention is rendered. The shorter this space of time is, of course, the more effective any first aid treatment becomes. And the more serious the injury, the more important is the first aid treatment and the time elapsing between emergency measures and complete medical attention. Therefore, first aid become a most valuable





First aid facilities should be provided on every temporary construction or industrial job.

servant when it is combined with well-directed preventive activities and medical services. Without these two forces working hand-in-hand with it, first aid can be entirely useless, more harmful than beneficial, or, at best, have only a beneficial psychological effect on worker treated.

A valuable practice is to make periodic surveys in industrial plants to see where the first aid equipment is located, if it is readily available in times of emergency when it is needed, what its contents are, and their condition.

If such a survey has convinced you that your present first aid equipment is either inadequate or out-moded, and you are determined to establish first aid equipment and service in your plant according to the conditions and needs, the first step should be based on the following facts:

1. The number of employees you have working for you in the plant.

2. The nature of the operations involved in producing your product. By this it is meant what type of machinery, processes, raw materials, and other equipment which may present an occupational hazard and be the cause of an injury.

3. The frequency and severity of injuries incurred in the past. An employee questionnaire will supply sufficient data, if you have kept no records of such injuries.

4. The availability of supplementary medical service. This includes the closeness of a physician or hospital for the treatment of any injuries after first aid treatment is rendered at the plant.

5. Where the first aid equipment or first aid room should properly be located. The location should be determined by concentration of employees for making the equipment available to the largest number of employees in the shortest possible time.

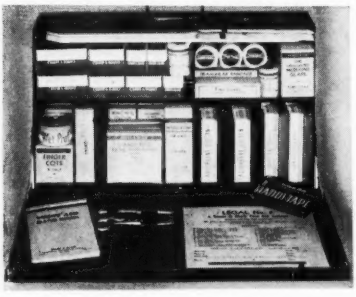
6. The extent and character of services contemplated. In other words, how extensive can you afford to make your first aid or medical services over and above legal or bare humane minimums?

7. A study of the first aid requirements in your state. A majority of the states today stipulate certain minimum equipment and first aid treatment for injured employees. These requirements vary from state to state, effecting only certain industries in some states, plants employing a certain number of workers, and covering all manufacturing concerns in still others.

Forms and valuable suggestions are obtainable from Labor and Health Departments, and from some state Industrial Hygiene Departments. Fairly large plants also find it wise to solicit the advice of an industrial physician.

Various types of equipment and unit sizes may be secured commercially according to your requirements. As a result of the information secured from your survey, you will be enabled to make a proper selection of the equipment you wish, specifying amounts and types of antiseptics, medication, dressings, etc.

If, as in all but quite large concerns, the services of a regular full-time nurse or physician is not practical, one or more employees, with the final responsibility resting on one if more than one are chosen, should be selected and trained to administer first aid treatment when the occasion arises. This one, or these several employees, should be given thorough training in the use of the equipment on hand and first aid methods for the treatment of all types of injuries which may arise in the plant. They should have a thorough knowledge of *what* equipment is on hand and *how* to use this equipment. Speed and correctness of treatment are of primary importance because of the emergency nature of the situations arising. The first aiders should be working within close enough vicinity of the first aid equipment that they can easily and quickly reach the materials, and should be impressed with the fact that all other matters are secondary when a situation arises where first aid treatment is required.



A typically modern industrial first aid cabinet. It contains materials for coping with accidents in mill, factory or foundry.

Photo courtesy Bauer & Black Co.

Another responsibility of the chief first aider should be that of checking the materials regularly to see that proper ones are available and that the equipment is in good condition.

Treatment beyond first aid should not be attempted. Qualified first aiders can determine not only what type of treatment should be given, but how far the treatment should be carried to fill the gap between the time of injury and the time complete medical attention can be secured.

It is the desire of every plant to reduce injuries and to achieve the objective of a no-accident record. "Temporary total disability" and "permanent partial disability" represent human suffering and a cost. They can often be prevented. In a great many instances emergency cases requiring first aid treatment seek attention for small injuries. However, we should not be deceived by the term "minor" in designating the nature of these injuries. In the aggregate, the so-called minor injuries represent a great amount of lost time and productive effort, which, together with the ever-present menace of infection, command a wholesome respect for their importance and the institution of modern first aid methods.

No plant, however small, can afford to disregard the importance of first aid equipment and first aid treatment. The suffering and cost inherent in any industrial accident are too great to justify ignoring even the minimum requirements.

Christmas decorations at G. E.'s Nela Park—glittering lighting display.

BETTER LIGHT ON THE SUBJECT

By DEAN M. WARREN
Secretary, Committee on Light & Safety
Illuminating Engineering Society

INSUFFICIENT or improper lighting in a factory is analogous to a partial blindfold upon the worker. With hampered vision, it is perfectly obvious that the worker cannot do his best, nor can he escape accidents which would otherwise be avoided.

The necessity for aiding the eyes in every possible way is greater than ever before because present day working standards impose a heavy tax upon our powers of vision. We think of these modern times as an age of labor saving devices in which machines and efficient production methods have largely relieved man of the strain of labor. However, these very products of civilization, while lifting burdens from the backs of human beings, have imposed greater strain on their eyes, minds, and nerves. And if the workman must perform his task under poor lighting, his alertness is decreased and susceptibility to accidents increased.

Of all the environmental factors which can be devised for workman safety, lighting is probably the most natural. Mr. M. S. Phillips, president of the Lake Erie Steel & Blanking Company of Cleveland, Ohio, has found this to be a truism. Said Mr. Phillips, "When we installed a general lighting system of Glassteel Diffusers, the most immediate result was a gratifying decrease in the number of accidents which are treated in the dispensary. Naturally, since our work is almost completely blanking and shearing of sheet steel, we run the risk of many cuts and deep scratches from the sharp edges of the metal. There is always the specter of serious infection from these minor cuts. In

addition to this material advantage, we felt that the morale of the men noticeably improved due to the decrease of accident hazards and the more cheerful working conditions."

In providing a lighting system to make working conditions safer, there are two factors which must be considered. (1) Quantity of Light. (2) Quality of Lighting.

Quantity of Light

There is no danger of obtaining too much light under sources of artificial lighting properly applied. The best lighting systems supply really meager light when compared to daylight. This is apparent when we compare the 3 to 5 footcandles which an industrial executive may find in some sections of his plant, with the 25 to 50 footcandles which are considered quite satisfactory for most seeing tasks, and the 100 and more which are required for critical seeing tasks. Even these values, which represent good lighting practice, are quite low when compared to the 500 footcandles found outdoors in the shade of a tree or the 8,000 footcandles found in bright sunshine.

Of course the eye will function and distinguish objects under lighting of less than 1 footcandle, *in order to avoid premature aging of the eyes, needless expenditure of nervous energy, and fewer accidents, it is necessary to provide more light than just enough for seeing.* This can be done economically today because of the progress the electrical industry has made. The cost of energy, equipment and lamps has been constantly decreasing and lamp efficiencies increasing. The lighting dollar now purchases ten times as much light as it did thirty years ago, which means that if the industrial executive will only spend as much for lighting his plant today as he did in 1908, he will have an excellently lighted plant.

The desirable quantity of light for any particular installation depends upon actual conditions, such as the accuracy of the operation, the fineness of detail to be observed, and the color of the goods worked on

Left— Mercury-Mazda fixtures in new Industrial Rayon Corp. plant at Painsville, Ohio. Below— Fluorescent daylight lamps in Crowell Publishing Co.

Top-Hazardous cond due to improper su mentary lighting. Bo —Correct supplemen lighting, the good ge illumination minim eye adjustments.

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or handled. Tables of recommended footcandles of illumination for various tasks are compiled and are generally accepted as a guide to current practice. These tables are based upon practical experience and economic justification. A few excerpts are presented to indicate the range of footcandle levels now recommended in industrial lighting practice.

Quality of Lighting

Quality of lighting refers to the general lighting effect, analyzed according to general or to specific requirements and its suitability with respect to the requirements it is

called upon to meet. There are several factors which deserve major emphasis, because on them determines whether or not the seeing environment is the best and most efficient.

Distribution

Where the lighting is very spotty with extreme contrast between bright and dim areas, it generally causes eyestrain and makes continued vision difficult because unconsciously the worker's eyes are continually trying to adapt themselves to the varied conditions in the field of vision.

In considering the matter of distribution to obtain good seeing conditions in manufacturing areas, two factors are of primary importance. *(1) Direct lighting units should be spaced no farther apart than their height above the floor,* and *(2) Where supplementary lighting is re-*

[*Continued on page 26*]

FOOTCANDLES FOR REPRESENTATIVE INDUSTRIAL OPERATIONS

(Figures represent order of magnitude rather than exact levels of illumination)

Operation	Recommended Footcandles
Assembling	
Rough	10
Medium	20
Fine	50-100
Extra Fine	100 or more
Inspection	
Rough	10
Medium	20
Fine	50-100
Extra Fine	100 or more
Machine Shops	
Rough Bench and Machine Work	10
Medium Bench and Machine Work, Ordinary Automatic Machine with Rough Grinding, Medium Buffing and Polishing	20
Fine Bench and Machine Work, Fine Automatic Machines, Medium Grinding, Fine Buffing and Polishing	50-100
Extra Fine Bench and Machine Work, Grinding—Fine Work	100 or more
Steel and Iron Mills, Bar, Sheet & Wire Products	
Soaking Pits and Reheating Furnaces	5
Charging and Casting Floors	10
Muck and Heavy Rolling, Shearing, Rough by Gauge, Pickling and Cleaning	10
Plate Inspection, Chipping	30-50
Automatic Machines, Light and Cold Rolling, Wire Drawing, Shearing, Fine by Line	15

Something To Think About

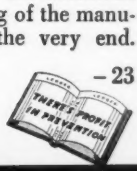
By Louis Schwartz, M.D.
Medical Director, U. S. Public Health Service

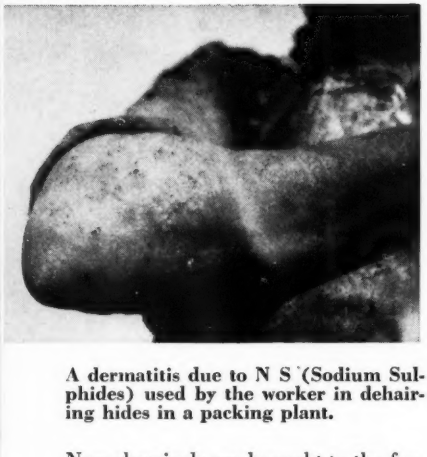
The dermatoses, industrial leaches, can be eradicated by simple preventive means.

CASES sometimes appear before Compensation Boards claiming compensation for disability due to a dermatitis which the worker claims to have suffered as a result of his occupation, but which at the time the case is being heard, has disappeared. In these cases it is also difficult to determine the causative factor. If patch tests done at this time are positive, they are of great help, but if negative, they are not, because the patient may have developed an immunity as a result of his recovery.

There is no one characteristic symptom on which a diagnosis of an industrial dermatitis can be made. The worker's occupation, the history of his skin eruption, its site and morphology and evaluation of the patch tests must all be taken into consideration by a dermatologist familiar with the substances and the processes of the worker's occupation.

Prevention is, of course, the chief dermatoses problem. The ideal program is to so safeguard operations that injurious chemicals do not come in contact with the skin. This can be done by installing totally enclosed processes. Modern factories are being built so that the worker need not come in contact with any of the chemicals used from the beginning of the manufacturing process to the very end.





A dermatitis due to N S (Sodium Sulphides) used by the worker in dehairing hides in a packing plant.

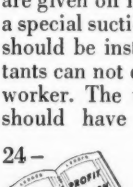
New chemicals are brought to the factory in enclosed railroad cars, emptied by suction hose into enclosed storage containers from which they are sent by turning valves to the various retorts and kettles through a closed system. From these kettles the finished product is processed in totally enclosed machinery, such as filters, grinders, etc., and placed into closed shipping containers by means of hose or pipes.

In many industrial processes, where this is not possible, or where there is old equipment, the workers must be protected by being compelled to wear suitable protective clothing, such as rubber gloves, aprons, masks and goggles. This protective clothing should be frequently cleaned and laundered. Oven processes from which are given off irritating dusts or fumes, a special suction ventilating apparatus should be installed so that these irritants can not come in contact with the worker. The work rooms themselves should have proper and adequate ventilating equipment so that dusts and fumes have no chance to accumulate in any concentration. Rules for the use of protective clothing should be enforced. When respirators or gas masks are furnished, the men should be compelled to wear them.

Cleanliness is of prime importance. The floors and walls of the work rooms should be kept scrupulously clean as should all machinery. Convenient shower baths should be installed and the worker should be compelled to take baths after work. In factories where there are special skin hazards, a double set of locker rooms should be provided, that is, one for street clothes and one for depositing the soiled work clothes. In this way, the worker coming to work will enter the first locker room where he will strip and leave his clothes in the locker. From there he proceeds through a hall to the second locker room where clean work clothes are waiting for him. From this locker room he proceeds to his work. At the end of the work shift he enters the locker room in which he had put on his clean work clothes. Here he deposits his soiled work clothes and goes to the shower baths. From the shower baths he proceeds to the locker room where he had left his street clothes and then goes home.

There are a few good protective ointments on the market, designed for the prevention of industrial dermatoses. Protective ointments are usually washed off by the workmen before leaving the factory. This act also removes the irritant chemicals from the skin and is no small part of the protection given by the ointment.

New applicants for work should be carefully examined and those having



such predisposing skin conditions as previously stated should not be employed in occupations where there is a skin hazard. In occupations which present serious skin hazards, all applicants for jobs should be stripped during the medical examination and should be patch tested with the materials with which they are to work and if found to be hypersensitive, they should be rejected. The workers should be encouraged to report to the medical department all irritations of the skin, no matter how trivial. There should be frequent medical examinations of the workers to discover the presence of skin diseases which have not been reported. The physician in charge should have a working knowledge of dermatology and give proper treatment for these cases, or if he does not have such knowledge, dermatological cases should be sent to a consulting dermatologist.

In applying medication to the lesions, only the mildest form of ointments or lotions should be used, such as boric acid or calamine. Strong ointments are apt to irritate the skin and cause more dermatitis.

It is not always necessary to remove the worker from his job in order that he may get well. Indeed, it is sometimes better to allow him to work, if he has a mild dermatitis, and treat him while working in the hope that he will develop an immunity or become "hardened," as the workers themselves call it. A great many workers will become hardened and the immunity thus acquired usually lasts while working and sometimes will continue for a considerable period after contact with the chemical has ceased so that the worker may stay away from his job for two or three weeks and come back and still be immune. If, however, he stays away for a few months, he will in most cases lose his immunity and will again have to go through the process of becoming "hardened." Those workers who develop such a severe dermatitis that they can not get well while working should be removed from the job and when they have become well they should be placed in some other part of the plant where they will not come in contact with that irritant.

PLANT physicians should take every opportunity to teach safety and cleanliness to workers. They should also carefully investigate the causes of any unusual occurrence of dermatitis and, if necessary, call in consulting dermatologists and safety engineers to help discover the cause and to institute proper measures to prevent recurrences. Plant physicians should also advocate pre-employment examinations and the regular periodic examinations of workers.

A dermatitis due to Ethyl Mercury Chloride, a fungicide which the worker was bottling for commercial sale.

Better Light—

[Continued from page 22]

quired the general lighting should also be used. This last point is becoming increasingly important as general lighting is being supplemented by a high level of local lighting over restricted areas where the seeing task is quite critical.

One lighting fault which may be classed under the heading of poor distribution is the presence of harsh, dark shadows. These constitute accident hazards by obscuring objects that should be seen. They slow up work and are likely to cause errors in operation. Shadowy interiors hide dust and dirt, thereby making it difficult to keep a clean plant. Shadows can be avoided by a consideration of the same factors that prevent poor distribution of light.

Glare

Glare is really negative light or light out of place. The more you have the harder it is to see. It is not comfortable to look at the sun when it is high in the heavens, neither is it comfortable to look at a sheet of water glistening in the bright sunshine. In looking at the sun direct glare is encountered. In looking at the sheet of water in the bright sunlight, reflected glare is experienced. Both are uncomfortable and one instinctively turns one's eyes away. Direct glare from a light source may result from *(1) Lighting equipment which does not confine the light principally to angles well above or well below the horizontal, but directs an excessive amount to the eyes. (2) Lighting units which are too bright because they are equipped with larger lamps than they were designed for.*

In planning a lighting system the aim is to provide a substantially uniform level of illumination throughout the room. This eliminates spottiness and dark corners and makes the entire work area equally suitable as a work place.

The number of outlets to provide for any given area is determined by the maximum allowable spacing between lighting units and this is in turn regulated by their height above the floor. The relation between height and spacing is based upon the distribution of light to procure a reasonably uniform level of illumination on the working plane.

Strictly speaking, the spacing for uniform illumination on the work depends upon the height of the light source above the surface to be illuminated, but since most work surfaces are from 2½ to 3½ feet above the floor, the spacing may, for practical purposes, be considered a function of the mounting height of lamps above the floor. In general, a spacing in feet which does not substantially exceed the mounting height will result in reasonably uniform illumination where direct lighting units are used.

Supplementary Lighting

Many tasks performed in industry today require higher levels of illumination for quick, safe seeing than can be economically provided by the general lighting alone. Such tasks can be effectively lighted by means of supplementary lighting equipment so located that they direct the necessary additional footcandles over the area where the seeing task is most severe.

[To be continued]

What you can't see can hurt you! Dangerous fumes can be eliminated, confined or avoided.

By E. R. HOLDEN, Ph.D.
Industrial Hygienist
Pittsburgh Plate Glass Co.

FUMES are generally distinguished from dust and smoke by two criteria, namely—method of formation and particle size. Processes handling metals at high temperatures produce fumes, the particle size of which will generally vary between 1/25,000th and 1/125,000th of an inch in diameter. This size is larger than most smokes and smaller than most dusts.

Such finely divided material will remain floating in the air of a workroom for long periods of time unless it is caused to clump together or unless it is removed by natural or artificial means. This fact leads to a longer time of exposure during which the material may be absorbed by man than will result with most dusts.

Fumes may produce transient diseases such as metal fever which rarely lasts for over twenty-four hours or they may cause serious impairment to health such as results in lead or manganese poisoning. The study of the potential health hazard involved in any process where fumes are present is divided into three phases, the chemical analysis of the workroom atmosphere, the medical and biochemical study of the exposed workmen and the engineering control of harmful conditions.

Each phase of the hygienic survey requires specially trained personnel and the results obtained by inexperienced investigators may be both worthless and dangerous.

A knowledge of the processes involved and of the materials handled is required before the air analyses are made. This information furnishes a basis for the choice of locations where the atmospheric samples will be taken. It is also advisable to make a time study of the operations as it is obvious that the time spent at the various work positions must be known in order to make a true estimate of each workman's exposure.

An electrostatic dust and fume sampler equipment.

Most investigators are agreed that electrical precipitators furnish the best, if not the only satisfactory method for the collection of fumes for analysis. They remove the material from the air by attraction to a plate carrying a charge opposite to one impressed on the fume. Recent development in their design have made them entirely safe and practical.

Although there is need for continued research in the development of methods of analysis for atmospheric contaminants, there are acceptable procedures now available in most cases. The analysis of the fume, whether it be lead, zinc oxide, etc., naturally will vary dependent upon the substance being studied.

It has been pointed out by many investigators that the most important tool in the protection of the health of workmen lies in the development of tests such as the urine sulphate test for benzol and periodic physical examinations. Such tests usually detect the absorption of the poison by the workman long before any demonstrable damage has occurred.

The principal methods for the control of fumes may be summarized as:

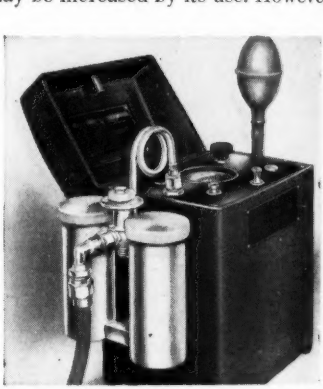
Elimination of the Hazard

Occasionally it is possible to substitute a material which will not generate toxic fumes in place of the dangerous substance. This method is limited by the lack of materials having the desired properties without the undesirable poisoning characteristics. There have been many cases, however, where it has been effective.

Changes in process should also be considered as a means of eliminating or controlling toxic fumes. Care should be taken, however, to prevent the introduction of a new hazard possibly more dangerous than the old one.

Prevention of Dispersion

By segregating the process which produces the fume the number of workmen exposed may be greatly reduced. This often requires a re-arrangement of floor space and should be planned jointly by the production supervisors and the engineer. Personal protective equipment must be used to supplement this control method as the exposure of a few workmen may be increased by its use. However,



An electric gas indicator for making Benzol fume determinations.
Photos Courtesy Mine Safety Appliance Co.

it allows better control of the hazard and has been very effective where exhaust ventilation is not practical.

Local exhaust ventilation is undoubtedly the most practical means of controlling the majority of industrial exposures as the removal of the fume at its source affords considerable adaptability. The hoods and exhaust ventilation should be applied as close to the source of the fume as possible as the effectiveness decreases as the distance increases. Attention should be given to the placement of the control equipment so that interference with the workmen may be minimized and also drafts avoided.

The material chosen for the hoods and ducts should be resistant to the action of the fumes and should be of a heavy gauge to prevent damage from rough handling. The frictional losses caused by dents in the piping have in many instances been sufficient to destroy the balance of a system.

In many cases it is necessary to provide an air cleaning plant for the removal of the fume from the exhaust system. This prevents the contamination of areas adjacent to the end of the exhaust pipe. There have been cases where the fumes from several lead pots have been blown out over the roof of a building and menaced other departments and companies.

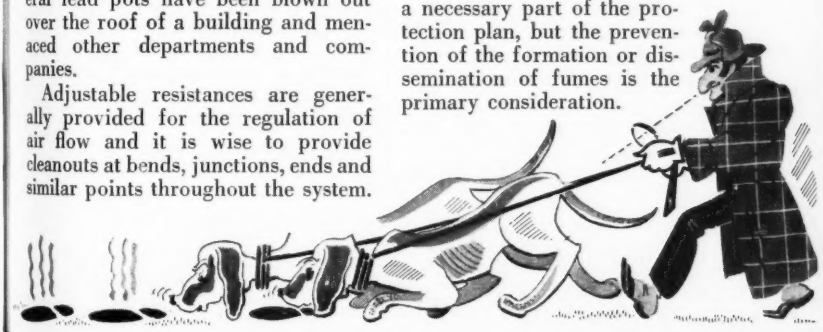
Adjustable resistances are generally provided for the regulation of air flow and it is wise to provide cleanouts at bends, junctions, ends and similar points throughout the system.

Personal Protective Equipment

The United States Bureau of Mines approval list for respiratory protective devices published in July 1938 states that no mechanical filter respirator for protection against fumes had been submitted to them. In light of this condition it has been common practice to recommend air line respirators or air supplied hoods for this purpose. Where such devices cannot be worn because of the accompanying restriction in movement, it has been the practice to provide dust filter respirators or canister masks of the U. S. Army type.

Where respirators are in use a plan for the cleaning and maintenance of the equipment by means of a central station has been found to be very effective. The equipment is marked with a numbered metal tag or by the initials of the workman by whom it is used. Two respirators are generally furnished for each man so that he will be assured of the best possible type of protection.

It should be remembered, however, that with few exceptions respirators should not be considered as a replacement or substitute for fume control. High grade respirators form a necessary part of the protection plan, but the prevention of the formation or dissemination of fumes is the primary consideration.



This Month in Washington

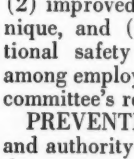
By W. T. CAMERON
Chief Safety Adviser, Division of Labor Standards
U. S. Department of Labor

PREVENTION of industrial accidents and occupational diseases was one of the major items stressed at the Fifth National Labor Legislation Conference held in Washington, November 14-16 under the sponsorship of the Secretary of Labor.

Outstanding among the recommendations adopted by the conference was that of the Committee on Prevention and Compensation of Industrial Accidents and Diseases which endorsed an attack on the problem of prevention through three channels, namely, (1) basic safety and health legislation, (2) improved factory inspection technique, and (3) initiation of educational safety and health programs among employers and employees. The committee's recommendations follow:

PREVENTION—Adequate power and authority should be provided for the prevention of industrial accidents and diseases. The provision for reporting all disabling injuries and occupational diseases should be compulsory.

(a) The adoption by every State of a Basic Safety and Health Law requiring all employers to provide: (1) reasonable protection to the lives, health and safety of persons employed in the State; (2) vesting in the Labor Department or Industrial Commission the power to establish minimum standards of safety and health by the promulgation of Industrial Health and Safety Codes; (3) set forth the right of the agency to enter places of employment; (4) the power to tag or seal dangerous machinery and unsafe or unhealthful places of employment; and (5) the penalty or penalties that may be applied against the violation of the Industrial Health and Safety Codes. The language of delegation of power must be specific and the law



should provide (1) for public hearing in formulating the codes, (2) publication of the codes after promulgation, (3) provision for administrative and court review, (4) set forth the agency that enforces the minimum standards, and (5) grant power to make variations or exceptions from the standards (if strict compliance would work an unnecessary hardship or injustice) only to the Department or Commission Head.

This monthly department is devoted to Federal agencies and their services and activities in various health and accident hazard matters.

(b) Improve factory inspection technique by: (1) Frequent periodic inspection of all places of employment; (2) inspectors selected on their qualifications as safety advisers and enforcement officers familiar with the statutes and codes: (3) institute safety and health training programs to insure a high degree of efficiency and uniform application of codes and laws; (4) by merit system or otherwise eliminate the turnover of qualified inspectors, the merit system to recognize practical experience as weighed against academic training.

(c) The establishment by State Labor Departments and/or Industrial Commissions of Industrial Safety and Health educational programs covering both employers and employees of the State.

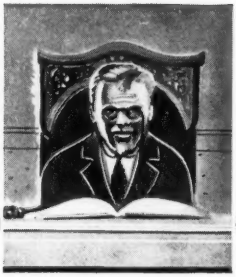
Co-ordination and centralization in the administration of labor laws was urged by the conference in adopting a report of the Resolutions Committee which made the following recommendation concerning industrial hygiene activities:

"RESOLVED, that in furtherance of centralized administration of laws for the protection of workers, this conference recommend that industrial hygiene activities be centered in the agency of the State which administers labor laws, and that any funds appropriated by the Federal Government for assistance in this field be made available to the State labor departments, meeting suitable standards as to organization, effectiveness, and program."

Labor leaders and labor law administrators—industrial commissioners, labor commissioners, workmen's compensation officials and safety and health administrators—from virtually every State in the Union, Alaska, the District of Columbia and Puerto Rico attended the conference. This marked the fifth time that a similar group has met under the auspices of the Federal Department of Labor.

In addressing the delegates to the conference the Secretary of Labor, Frances Perkins, stressed the recent advances which have been made in labor legislation and its relation to industrial hazards.

Actual dust explosion produced in miniature grain elevator. Demonstration by the Chemical Research Div. of the Bur. of Chemistry, U. S. Dept. of Agriculture.



RIGHT OFF THE DOCKETS

Briefs and digests of recent court decisions on matters regarding workmen's health and accident compensation.

Cancer From Sulphuric Acid Mist; Ignorance of Hazard No Excuse

A NEGLIGENCE action brought to recover damages for a cancer of the lip caused by the presence of sulphuric acid fumes in a storage battery plant, was held by the Federal Circuit Court to be proper. In answer to the contention that the employer did not know that the fumes could result in cancer, the court stated: "Where scientific knowledge was available respecting sulphuric acid mist as it was found in employer's plant, employer was chargeable with negligence in failing to provide precautionary measures, irrespective of actual knowledge of danger."

The Court suggested further, that there were various publications and persons from which and whom the scientific information could have been obtained, if proper inquiry had been made. BOAL vs. ELECTRIC STORAGE BATTERY CO. (Circuit Ct. of Appeals—3rd District—Pennsylvania) 98 Fed 2nd 815 (August—1938)

Commission Reversed and Blood Poisoning Compensated

A blood poisoning was the injury in this case. The claimant, a teamster, had as part of his duties the job of the currying of his team, and the trimming of their manes. He discovered a pimple on his forearm, with a horse hair, the color of his team's manes, in the center of the pimple. The inflammation spread, and blood poisoning resulted. The medical testimony was to the effect that the germ causing the poisoning was prevalent about barns and stables, could not come from human beings, and could enter only through an incision or wound. Despite this testimony, the commission refused to make an award to the claimant.

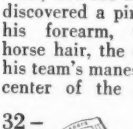
The Supreme Court annulled the Commission's ruling, finding that all the facts led to the conclusion that the injury was caused as a result of the claimant's employment, and that the Commission's holding was arbitrary and unreasonable. ADAMS vs. INDUSTRIAL COMMISSION OF UTAH (Utah) 82 p. 2nd 693 (Sept.—1938)

Sufficiency of Notice to Employer; and Effect of Prior Disease

An award in a case in Idaho was resisted on the grounds that the claimant had not given notice of the accident, and further, that his condition was not due to the accident but resulted from a prior osteomyelitis (bone disease).

The claimant was a hooker in connection with skidding logs for the defendant. While engaged in his work, one of the logs caught a small tree which sprang back and struck the claimant on the knee. The claimant experienced pain, but was not compelled to discontinue work until ten days thereafter. The claimant went twice to the company's doctor, who refused to treat him, claiming the injury was the result of a

Digested and compiled
By HILTON E. ROBERTS
Member the Ohio & New York Bar Associations



previous disease, and not of the accident. The claimant gave no notice other than the visits to the doctor.

The court held that the visits constituted sufficient notice, and the company was in no way prejudiced by the workman's failure to give any further notice. It was held, further, despite expert testimony to the contrary, that the testimony of the attending physician, together with other evidence, was sufficient to warrant a finding that the injury was a result of the accident, and not of the prior osteomyelitis. ARNESON vs. ROBINSON (Idaho) 82 P. 2nd 249 (July, 1938)

Two Michigan Cases of Interest; Dioxide Gas and Lead Fumes

In a recent case, the death of an employee of a refrigerator company resulted from the inhalation of dioxide gas. The gas escaped from defective refrigerator units on which employee was not working, but which were transported to the room where the employee was engaged in the process of polishing and grinding pieces of metal from other refrigerator units.

The claim was asserted that the dioxide gas poisoning was an "occupational disease," and not compensable. The court made an award, holding that the death was an "accidental injury arising out of and in the course of employment." DAWES vs. NORGE DIVISION of BORG-WARNER CORPORATION et al—(Supreme Ct. Michigan) 281 N.W. 549 (October—1938)

Another case involved poisoning from lead fumes. The plaintiff worked in a foundry room where lead and copper were melted together and poured into graphite molds. During the process, poisonous lead fumes were given off. A ventilating system with hoods and suction fans was installed, and the men wore protective masks. One of the ventilating fans was put out of commission when a fire broke out and burned its motor. Work was continued for some three hours while the fan was not working. Subsequently, the plaintiff was hospitalized because of lead poisoning, and he claimed his disability resulted from the fire and the breaking of the fan—in other words, that it was an accidental injury arising out of and in the course of employment.

An award was denied, one of the grounds for such denial being that the lead poisoning was not an accident resulting from the fire, but had been acquired by reason of the plaintiff's work, over a long period of time—in effect, that it was an "occupational disease," and not compensable. MCINTYRE vs. BOHN ALUMINUM & BRASS CORP. et al. (Supreme Ct. of Michigan) 281 N.S. 312 (October—1938)

NOTE: Between the time that the injuries in the above cases were sustained, and the time that the cases were decided, the State of Michigan amended its Workmen's Compensation Act, and made thirty-one "occupational diseases" compensable. (Act #61 of the Acts of 1937). Under the act as amended, an award now would be made in a case like McINTYRE vs. BOHN ALUMINUM & BRASS CORP. et al.

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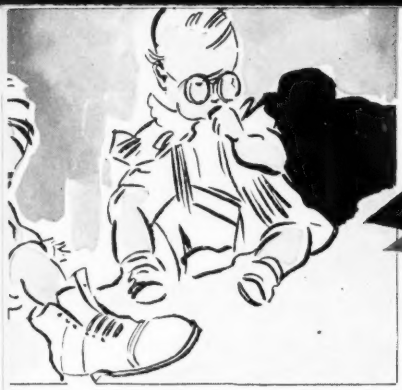
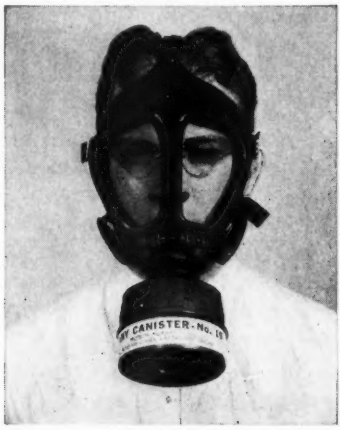


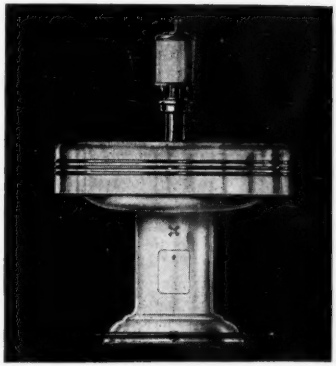
New Produc

FULL VISION GAS MASKS

ACME Protection Equipment Company, Inc., 3691 Liberty Ave., Pittsburgh, Pennsylvania, manufacturers of respiratory protective devices, announces a new No. 5 full vision snout type canister gas mask. Freedom of vision and movement, light weight and assured protection are its notable features.

The No. 5 mask is recommended for use in low gas concentrations or for short periods in higher concentrations. Canisters are available for protection against practically all poisonous gases including organic vapors and acid gases, ammonia, hydrocyanic acid, chlorpicrin, etc.





NEW WASHFOUNTAIN

A new streamlined, space-saving, sanitary washfountain has been announced by the Bradley Washfountain Co., Milwaukee. The fixture is semi-circular, 36″ in diameter, with a capacity of three persons. The fixture is available in enameled iron or stainless steel, hand or foot controlled and in standard or deluxe models. The new washfountain is designed to bring the advantages of group washing to the small washroom.

AUTOMATIC SHUT-OFF VALVE

An automatic shut-off valve to be placed in the supply line above flexible hose used to convey compressed air, steam, gas, or fluids under pressure, that immediately shuts off the supply when there is a break in the hose or the hose becomes disconnected is now being manufactured by the D. J. Murray Manufacturing Co., Wausau, Wisconsin, under the trade name "Murray-Lorge."

THE FIELD

TESTS SIGHT DEFICIENCY

A new scientific instrument has been announced by the American Optical Company, Southbridge, Massachusetts, to determine whether a person is deficient in Vitamin A. This essential vitamin is called upon by nature to regenerate visual purple, a substance found in the retina of the eye and necessary for seeing in dim light. A deficiency in Vitamin A results in what is commonly called "night blindness." Exposure to glare or strong light bleaches out the visual purple, resulting in a partial blind period lasting until the regenerative process restores the retina to normal.

The Adaptometer, as the new instrument is called, tests the vitamin A deficiency of a person in eight minutes. The subject tested is seated in a dark room facing the instrument, his eyes fixed on a strong light in the upper part of the Adaptometer. After three minutes exposure the bright light is turned off and a very weak test light is automatically switched on. This test light becomes visible to the subject only after sufficient regeneration of visual purple, bleached out by the strong light. The time for this regeneration in normal cases should not exceed five minutes.

DUST SAMPLING EQUIPMENT

Two new instruments for more accurate dust sampling are announced by the Mine Safety Appliances Co., Pittsburgh. The M.S.A. Midget Impinger is featured as the latest development is dust sampling ap-

paratus employing accurate impinger methods. It is small, light (weighs less than 10 lbs.), compact, and provides convenient portability with easy hand operation. The instrument samples at the rate of one-tenth of a cubic foot per minute and is operated by a hand-cranked, positive-acting 4-cylinder pump. This pump, in conjunction with a vacuum regulator, maintains an unfluctuating suction regardless of minor variations in the rate of smoothness of cranking. It is claimed that dust surveys with the new Midget Impinger may now be more easily and quickly conducted, and with the same dependability as was previously provided only by a large impinger.

The M.S.A. Electrostatic Dust and Fume Sampler is designed for quantitative sampling, and employs the principle of preionization with electrostatic precipitation. The unit is compact, easy to use in sampling from the general atmosphere or from stacks or ducts, and is said to be especially efficient for metal fumes. The instrument has a sampling volume of 3 cu. ft. per minute, permitting accurate determinations of very low concentrations of atmospheric particulate matter; flow measurement with orifice and mechanical manometer; extension tube for sampling at breathing level with apparatus on the floor; and collection of samples in an aluminum tube for determinations by weight, count or chemical analysis.

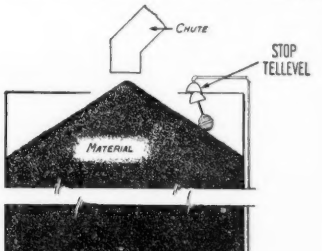
DUST CONTROL UNIT

A new dust control unit manufactured by the Falstrom Company, Passaic, New Jersey,

is named *Dustrol*. It is designed as a self-contained unit for collecting, separating and filtering dusts. No extra blowers, motors, drives or collectors are required, according to the manufacturer. DUSTROL is a portable dust-collecting unit for use with sawdust, grinder dusts, rubber dusts, metallic particles and various other materials.

AUTOMATIC STORAGE CONTROL

A new Tellevel Automatic Storage Control is offered by Stephens-Adamson Mfg. Co., Aurora, Illinois. Automatic control of the level of materials in bins or hoppers,



and of liquids in storage tanks is accomplished by the Tellevel starting and stopping the conveyors or elevators feeding the bin or tank. It is stated that a number of Tellevels have already been placed in operation and reactions forecast a favorable acceptance.

GAS INDICATORS

The Linde Air Products Co. announces that improvements have been added to their line of UCC Gas Indicators to increase their efficiency for quickly and easily detecting explosive or toxic gas-air mixtures. These indicators are available in three models. Model 12-b is for the detection of combustible gases or vapors. A graduated meter scale indicates by direct reading whether combustible gases are present, and,

if they are, whether concentrations are above, within or below excessive limits. A flametype safety lamp is available with this model which makes it further possible to detect oxygen deficiencies.

The UCC All-Service Indicator, Model B-1 combines three units in one. It shows the presence of combustible gases, indicates an oxygen deficiency, and, in addition, includes a toxic chamber for determining the presence of carbon monoxide and hydrogen sulphite in toxic concentrations.

Both model indicators are equipped with a patented and exclusive air dilution valve by which incoming samples can be diluted with any volume of air, thus making it possible to detect flammable conditions, which might not otherwise be indicated due to a lack of oxygen. This valve also permits following a complete purging operation from start to purge-end point with the use of inert gas as a purging medium.

GRINDER DUST CABINET

A self-contained dust-removal cabinet has been developed by the Delta Mfg. Co., Milwaukee. The cabinet contains dust filters which trap practically all of the fine dusts carried down the discharge chutes of a grinder. The cabinet is also fitted with baffles which discharge all of the heavy particles into the cabinet base, where the dust may be removed easily. This new device may be attached to any Delta pedestal grinder. The unit requires no power, and, being self-contained, may be used anywhere.

ANTI-FOGGING DEVELOPMENT

The Lensite Company, 105 S. LaSalle Street, Chicago, Illinois, have presented a new product known as "Lensite," designed to prevent fogging, steaming and frosting of glasses, goggles, windshields and other glass surfaces. The effectiveness of this product has been demonstrated by severe tests and an unusual acceptance. It is said that one application of "Lensite" will prevent goggles, for example, from steaming, fogging, or frosting for a full day, which represents a marked contribution to the safety products field.

RECLAIMING SPRAY BOOTH

Binks Manufacturing Company, Chicago, offers a Dynaprecipitor Unit which is designed to give the highest efficiency in reclaiming all types of paint, synthetic enamel, ceramic and all other type materials. Originated and developed to take the place of the ordinary water wash chamber for spray booths, outstanding features of the unit are said to be new precipitator plates and a water curtain. It is claimed that the unit will give a 99% elimination of paint from spray fumes.

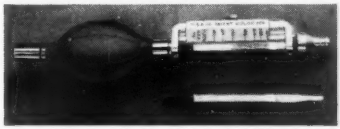
TIE CLASP EMBLEM

Something new and attractive is offered by the Williams Jewelry and Manufacturing Co., Chicago, Ill., in the way of a safety emblem that is suspended from the tie clasp. Any type award emblem can be mounted on the clasp, depending on the nature of the safety program conducted.

GAS INSTRUMENTS

Mine Safety Appliances Company, Pittsburgh, announces three new gas instruments, each combining the latest developments in the detection of hazardous gases.

Ease of use and handling, lightness and small size are outstanding characteristics of the new M.S.A. Hydrocyanic Acid Gas Detector. The instrument provides an accurate reading in less than two minutes, determining actual gas concentration in amounts ranging from 0.005% to 0.10% by volume.



The M.S.A. Methane Tester, pocket-size, is designed to give positive, immediate indication of the methane content of air in concentrations much lower than can be determined by a flame safety lamp. Carrying the approval of the Bureau of Mines, it is claimed that this instrument achieves an accuracy comparable to that obtained by analyzing bottle samples with an Orsat gas analysis apparatus. The device can be used on the job by any workman.

The new Benzol Indicator, is compact, portable and ruggedly built, with a range of from 0 to 1000 parts of benzol per million parts of air. Benzol concentrations may be read directly on scale within twenty p.p.m. It is stated that this modified combustible gas indicator is nearly fifteen times as sensitive as Standard Combustible Gas Indicators, and is designed specifically for investigation of benzol concentrations.

Where There's Smoke—

[*Continued from page 12*]

monoxide combines with the oxygen to form carbon dioxide, and by measuring the decrease in volume caused by the burning and the volume of carbon dioxide formed, the volume of carbon monoxide originally present may be calculated.

There are other methods available which are used to detect the presence of CO in the atmosphere and determine the volume of its concentration. But the ones described briefly in this article are the chief methods.

Accidents *will* happen! There should be at least one person in every plant, in which carbon monoxide is an active or potential hazard, trained and qualified in the Schaefer method of artificial respiration. An inhalator should also be immediately available, and the foremen familiar with first aid treatment for CO poisoning.

Exposure to CO hazards are incident to many types of work. For workers so endangered, four types of respiratory protection are being successfully employed:

1. Gas masks—afford protection only in relatively low concentrations of noxious gases and should not be used where the air contains less than 16% of oxygen. Special gas masks, containing hopcalite, protect against CO concentrations exceeding 3%, but the intense heat produced cannot be endured for long periods.

2. Hose masks—afford protection in irrespirable atmosphere but the length of the host limits the distance the wearer may go from the source of fresh air.

3. Self-contained oxygen breathing apparatus—the only safe means for exploring mines and other places filled with irrespirable gases in high concentrations. Should be used and checked by trained men only.

4. "Self-rescuer"—a small gas respirator which protects the wearer from air contaminated with moderate concentrations of carbon monoxide. The purpose of the CO "self-rescuer" is to help miners escape from mines in which fires are burning or explosions have occurred.

Testing the atmosphere for the presence of carbon monoxide where it might be a hazard and providing protective devices will do much to eliminate it as such.

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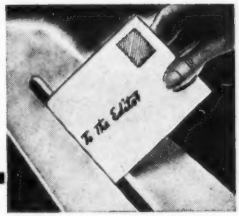


QUESTIONS AND ANSWERS

All questions from readers are answered by individual letters. A few of these of general interest are selected for publication. Information on any phase of industrial health or safety is freely supplied readers.

Heat Fatique in Winter

DURING hot weather the great majority of our workers use salt tablets. But when the summer season passes and cooler weather comes along they do not feel that they need the salt. Due to the nature of the operations in our plant workers are exposed to high temperatures the year around. Wouldn't the salt tablets be just as valuable in the winter months as during the summer to prevent heat fatigue?

R. T., Detroit

It is generally recognized that the use of salt by workers performing heavy tasks in high temperatures will decrease the possibility of heat sickness and cramps. Excessive and continuous sweating depletes the body supply of sodium chloride or salt and may bring about chemical changes in the body to cause dehydration, fatigue and exhaustion. A man working in high temperatures can be as subject to loss of moisture in winter as during the summer months. The salt will not prevent excessive perspiration, but is used to replace body salts lost in that manner.

Creosote Burns

Occasionally some of our workers receive burns from the handling of creosoted material. Although these are not serious or numerous we would appreciate some information on how to protect workers against such burns, and also what first aid treatment is suggested in such cases. Your courtesy in this matter will be appreciated

T. L. R., Louisville, Ky.

Wherever possible wood and other materials treated with creosote should be handled with tongs or some other "gripping" device to eliminate contact of the creosote with the skin. Hands and other parts of the body exposed to the creosote should be protected with impervious gloves and other clothing.

Several different ointments have been recommended for the treatment of creosote burns and for protection. An ointment consisting of 145 grams calcium carbonate; and 285 grams pine tar, zinc stearate and petrolatum is suitable. Also, a soothing ointment consisting of one part tragacanth and three parts lanolin may be used to rub on the skin for protection against irritating effects from creosote.

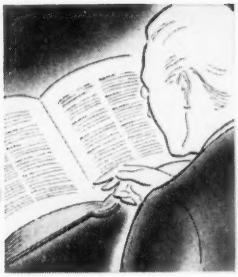
Sterilizing Respirators

We have been using a certain sterilizing method in cleaning our respirators but some of the men feel that the method employed is not entirely sanitary. Could you suggest for us one or two methods which we might use? *H. T. K., Reading, Pa.*

It may be possible that the one of the methods we suggest is the one which you now use. However, as you request, we are glad to suggest several methods which you may find entirely satisfactory. First, scrub rubber and metal parts thoroughly with soap and water. Rinse in warm water and immerse for ten minutes in a solution of formalin made by placing one part of 40% formaldehyde solution in 9 parts of water. In place of the formalin solution,

[*Continued on page 40*]

GLOSSARY OF TERMS



Definitions of technical and medical terms, not in common usage by laymen, included in articles of this issue.

Axilla—The armpits.

Bacillary—Related to or caused by bacilli.

Eczematosis—The occurrence of an extensive eczema.

Epidermophytosis—An itching infection of the skin.

Epithelioma—A cancerous growth originating from scaly, skin, particularly around the breasts and lips.

Hemoglobin—The coloring matter of the blood.

Hydrocarbons—Compounds containing only hydrogen and carbon.

Incubation—The development of an infectious disease from the period of infection to that of the appearance of the first symptoms.

Keratosis—Any disease of the epidermis, especially one marked by the presence of circumscribed overgrowths of the horny layer.

Lesions—A wound or injury. One of the individual points or patches of a disease of the skin.

Mycosis—Any disease caused by the presence of fungi or bacteria.

Onycholysis—Loosening or shedding of the nails, beginning at the free border and usually incomplete.

Papillomata—A group of circumscribed overgrowths on certain parts of the skin, including warts and horny, scaly surfaces.

Paronychia—Inflammation of the structures in the distal phalanx of a finger or toe, either those surrounding the nail or bone itself.

Papule—A small, circumscribed elevation of the skin, containing no fluid.

Pustule—A small circumscribed elevation of the skin, containing pus.

Seborrhoeic—A condition of the skin where there is an accumulation of greasy scales or crusts.

tinea cruris—A ringworm of the inner side of the thighs and the perineal region.

tinea versicolor—A chronic eruption of brownish-yellow, branny patches on the skin of the body due to the presence of fungus.

titrate—To analyze volumetrically by means of a test solution of standard strength.

Questions and Answers

[*Continued from page 39*]

1 part of carbolic acid in 33 parts of water; or 1 part of Lysol in 50 parts of water; or 8 parts of denatured alcohol, 3 parts of water may be used. Immediately after immersion, thoroughly rinse the respirators with water and in a clean place to dry.

Bureau of Mines Seal

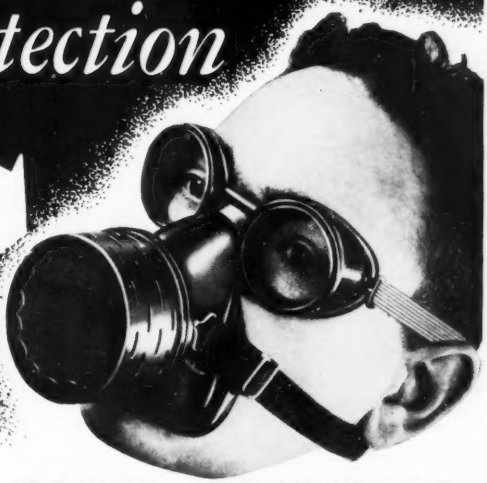
We have been urged to purchase only that equipment which carries the United States Bureau of Mines seal. What does this seal mean with respect to the safety of the equipment and its use?

J. S. R., Tulsa, Okla.

The United States Bureau of Mines permissible seal means simply that the device or equipment has been tested and approved by the Bureau of Mines for a certain purpose, under specific regulations. This does not necessarily mean that just because a device bears this seal that it can be used under any conditions and under any regulations. The usual safety precautions should be taken at all times to assure the proper usage of equipment, and a device bearing the seal has only been tested and approved for use under certain specified conditions.

Comfortable Protection

FROM TYPE A DUSTS



AMERICAN R1000 RESPIRATOR

(PATS. PEND.)

Gives Long, Positive Protection

New improved filter cartridge is protected from grease and dirt . . . lasts as long as the respirator mask, when given reasonable care. Pliable mask fits any face, maintains comfortable air-tight seal. Inhalation valve minimizes re-breathing. Twin exhalation valves assure positive expulsion of vitiated air. R1000 is easily cleaned, quickly checked for proper fit . . . gives full visibility, with or without goggles. Economical to buy and use. *Write for Full Details.*

Approved for Type A Dusts by U. S. Bureau of Mines

American Optical Company

Manufacturers, for more than 100 years, of products to aid and protect vision.
Factories at Southbridge, Mass. In Canada, Consolidated Optical Co., Ltd.
Branch offices in all principal industrial centers

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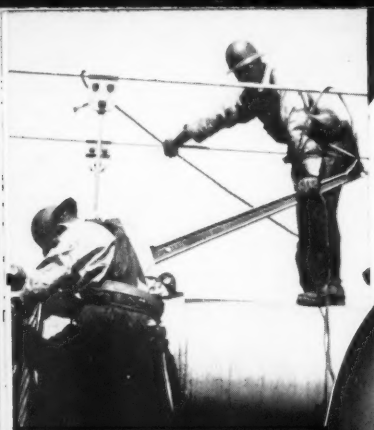

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of falls, bumps, blows and jars that
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Study the briefly-described Skullgard
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made for *you,* and let us arrange to sh
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be glad to do so, without obligation
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